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ZOOLOGY.

The Antennal Sense Organs of Insects.[1]—During his studies carried on in Leuckart's laboratory on the peculiar sense organ in the the base of the antenna of certain Diptera *(Mochlonyx culiciformis, Corethra plumicornis)*, Mr. C. M. Child found that the organ occurs generally in Diptera, and, if not generally, at least very often in the other orders of Insects.

In the wasp (*Vespa vulgaris*) the organ occurs in the second joint of antenna. Near the end of the first joint the main nerve of the antenna gives off branches on all sides. These run toward the periphery of the second joint, connecting with ganglion cells, which in turn connect with small rod-like bodies that end in the articular membrane between the second and third joints. These rods are gathered into groups each of which ends in a pore in the membrane. On the outside of the antenna no sense hairs are found corresponding to these pores, which seem to be closed on the outside. Between the rods nuclear elements were found, but whether they were of connective tissue or of nerve elements was not determined. An organ similarly placed and of similar structure is to be found in the genera: *Melolontha* (*Coleoptera*), *Epinephele* (*Lepidoptera*), *Bombus* (Hymenoptera), *Pachyrhina, Tabanus, Syrphus, Helophilus, Musca, Sarcophaga* (Diptera) *Sialis, Panorpa*, and *Phryganea* (Neuroptera), *Libellula* (Pseudoneuroptera.)

Of the Hemiptera only the Homoptera were investigated. Here the rods and ganglion cells are fewer in number. *Periplaneta, Locusta* and *Stenobothrus* among Orthopteran genera have a structure in the second antennal joint with ganglion cells and long fibrous rods. Thysanura were not studied.

In certain Diptera (Culicidæ and Chironomidæ) the organ is somewhat different. At the base of the antenna of both sexes there is a nearly spherical joint. This is larger in the male than in the female. In the latter the nervous structure within this joint is much more readily comparable to the organ described for the wasp than that in the male. But even in the male the structure may be reduced to the general type. In the female the rods instead of ending at the periphery of the second joint are directed toward the middle of the long feeler. The large antennal nerve runs chiefly to the ganglion cells, giving off two small branches that run on into the other joints of the antenna. There is no sharp line to be drawn between the ganglion cells of the organ and the brain. The rods are delicate and covered with small nuclei very well supplied with chromatin.

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[1] Zool. Anz. XVII, p. 35, 1894.

To what has already been made known by Weismann and Hurst on the general development of the antenna in these insects, Mr. Child adds that the entire sense organ is formed from a fold at the base of the invaginated hypodermal cavity, and that the differentiation of the rods and ganglion cells takes place very early.

The organ he considers to be auditory in function, agreeing with Johnston, Mayer and Hurst.[2] Supporting this view is the fact that the rods are so placed as to be affected by any slight motion imparted to the distal part of the antenna, either by sound waves or otherwise. It has been repeatedly shown by others that certain insects seem to hear by means of their antennæ. To offset the fact that the so-called tympanum of certain Orthoptera is considered to be auditory he recalls the experiments by Graber, who found that insects in which the tympanum had been destroyed still reacted to sound waves which affected the antennæ or in some cases the legs. The organ is of further interest in that there is shown in it no marked difference between hearing and touch.—F. C. KENYON.

The Luminous Organs of Histioteuthis rueppellii Verany.—Dr. Joubin has recently been making a study of the luminous organs of a rare cephalopod, *Histioteuthis rueppellii*, found near Nice. The animal belongs to the abyssal fauna and the specimen in question is over a meter in length. The author describes the outward appearance of its phosphorescent organ, and its internal organization, comprising a reflector, which the author calls a mirror and an apparatus for producing light. Mr. Jourbin offers the following theory of the use of the luminous organ to the animal.

" Ordinarly the light-producing apparatus does not function. It is like a machine at rest. But if a living creature suitable for food wanders into the vicinity of the cephalopod, this prey being of a higher temperature than the water in which it floats emits caloric radiations. These heat rays impinge on the reflecting mirror and are then concentrated in the light-producing apparatus, causing there a sensation, and the organ functions by reflex action. The surrounding medium is then illuminated by rays perceptible by the eye of the animal. In a word, these organs are the organs of a caloric sense. Heat sensations are the only kind that can be felt in those abysses when the darkness is relieved by occasional gleams of phosphorescent light. I add, finally, that I have found in another cephalopod an extremely curious organ constructed in such a manner that it does not perceive light rays, but can only receive heat rays, which confirms the hypothesis just advanced," (Bull. Soc. Sci. et Med. de l'Ouest France, t. II, no. 1893.)

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[2] Johnston.—Auditory Apparatus of the Culex Mosquito. Journ. Micr. Sci. III, old series.

Mayer.—Researches in acoustics. Am. Journ. Sc. Series III, vol. 8.

Hurst.—The Pupal Stage of *Culex*, Inaug.-Diss. Leipzig, 1890.—On the Life History and Development of a gnat. Trans. Manchester, Micro. Soc., 1890. The Post-embryonic Development of Culex. Proc. Liverpool Biol. Soc. IV.

Verrill's Organ.—In the funnel of certain Cephalopods, several authors have noticed a peculiar cushion-like organ, situated a little behind the valve, and this has, for very insufficient reasons, been called Verrill's Organ by Hoyle and others. Its function and homology have been the subject of some discussion. Ferussac and D'Orbigny confused it with a transverse muscle; H. Müller, in 1852, thought it was a stinging organ; Verrill, in 1882, considered it "the true homologue of the foot of gasteropods;" Laurie, in 1888, from rather insufficient material, showed its glandular nature, and believed that it secreted mucus, but his observations were criticised by Brock; Hoyle, in 1889, believed that it served to close the funnel. That it is really a mucous gland is now proved by the careful observations of G. Jatta (Boll. Soc. Nat. in Napoli, vol. VII, p. 45, 1893), who has observed it in 32 species belonging to 21 genera, thus bringing the number of genera in which it has been found from 10 to 27. He describes and figures six main modifications of its arrangement, and gives excellent drawings to show its microscopic structure in different stages of its development. He concludes that this funnel organ is a mucous gland homologous with the pedal glands of other mollusca. If this be so, the organ must be somewhat archaic, and one would expect to find it in *Nautilus*, where, to the best of our knowledge it has never been described. (Nat. Sci., Feb., 1894.)

Preliminary Descriptions of Some New South American Characinidæ.—1. *Tetragonopterus heterorhabdus.* This species is related to *T. schmardæ* Steindachner. It is readily distinguished from *T. schmardæ* by the conspicuous dark lateral band which has on the anterior end an oval expansion resembling the humeral spot present in in many species of *Tetragonopterus.*

D. 10 ; A. 20–23 ; head 3½ ; depth 3½, eye in the head 2½ and once in the inter-orbital ; scales 32–34, the lateral line incomplete, only 6 scales perforated.

Maxillary toothless, extending nearly to the centre of the pupil of the eye. The dark-brown lateral band, deepest colored anteriorly, edged above with a conspicuous silvery band. No caudal spot. Dorsal about midway between the tip of the snout and base of the caudal, and over the space between the anal and ventral. Anal with first six rays elongate. Many specimens from Brazil. Length 10–29 mm.

2. *Tetragonopterus paucidens.* Related to *T. diaphanus* Cope from which it differs in having 1 to 3 maxillary teeth ; in proportions and in lateral markings.

Head 3½ ; depth 2¾, in the length. Snout 3½, diameter of the eye 3 in the head. The maxillary extends to the anterior border of the pupil. A silvery lateral band and a diffuse caudal spot present. No humeral spot.

D. 11 ; A. 19 ; scales 5–31–3 ; lateral line complete. Length 45 mm.

One specimen from Itaituba, 45 mm. long.

3. *Tetragonopterus santaremensis.* This species has much the appearance of *T. bellottii* Steindachner. The scales of the lateral line are perforated to the base of the caudal while in *T. bellottii* only 5 to 7 scales are perforated. The caudal spot is somewhat more rhomboidal and extends to the end of some of the rays, otherwise the lateral band and humeral spot are about as in *T. bellottii.*

Head 3½ ; depth 3¼ in the body. D. 10 ; A. 20–22 ; scales 5–30–3. Anterior dorsal and anal rays elongate. Snout short, 4 in the head. Maxillary toothless, extends to the eye. Diameter of the eye somewhat more than the width of the inter-orbital and 2½ in the head.

Ten specimens from Santarem, 8–24 mm. long.

4. *Tetragonopterus astictus.* Related to *T. humilis* Günther. It differs from that species in having no caudal or humeral spot, no red margins on the anal and ventral fins and fewer rows of scales.

Head 3½, depth 3½, in the length. Eye 2½ in the head and once in the inter-orbital space. A silvery lateral band present, most distinct posteriorly.

Lateral line complete, scales 5–35–3½. D. 10 ; A. 30. Maxillary toothless, extending a little past the anterior margin of the orbit.

One specimen 53 mm. long from Brazil.

5. *Aphyocarax maxillaris.* Maxillary with minute teeth along its entire margin. Intermaxillary with about ten teeth, the inner four three-pointed. Mandible with a few conical teeth in front.

Depth 3–$3\frac{1}{3}$; head $3\frac{1}{2}$. D. 11; A. 22–23 scales; 30, tubes 6. Snout very short, the maxillary extending beyond the anterior margin of the eye.

A small circular humeral spot present, sometimes reduced to two or three color cells. A large black spot on the upper half of the first dorsal rays, the tips of these rays white. A small black spot near the tip of the first fur and rays.

A. agassizi Steind. differs from *A. maxillaris* mainly in its larger number of anal rays. Brazil, 10 specimens, 10–11 mm. long.

6. *Aphyocarax heteresthes.* Maxillary teeth six, conical. Intermaxillary with eight conical teeth and two with lateral cusps on each side. This species is related to *A. agassizii* Steindachner and *A. eques* Steindachner. From the former it differs in having only the upper part of the maxillary dentiferous and apparently in having the anal rays graduated. From the latter it differs chiefly in having no humeral spot.

Depth 3; head $3\frac{1}{3}$. D. 11; A. 27–30; scales about 31. Snout very short, maxillary long, extending considerably beyond the anterior margin of the eye. Eye twice the length of the snout, $\frac{2}{7}$ the length of the head. Origin of the dorsal midway betweeen the tip of the snout and the base of the caudal. Upper half of the first five developed rays of the dorsal black.

Brazil, 6 specimens, 14–17 mm. long.

7. *Mylesinus macropterus.* Body deep, $1\frac{5}{7}$ in the length. Head $3\frac{1}{2}$. Abdominal serrations 11 behind the ventrals, the posterior four in pairs, 22 to 25 smaller ones before the ventrals.

D. I, 16; A. 36; V. 7. Scales small, about 83 in the lateral line which is deeply curved below the origin of the dorsal. Height of dorsal fin $2\frac{2}{3}$ times its length, the second and third rays greatly elongate, the fourth ray about half as long. Anal without lobes.

Snout little more than half as long as the diameter of the eye, the inter-orbital space a little more than the diameter of the eye. Lower jaw greatly projecting. Teeth in the mandibles in one series, notched and wide apart.

Brazil, 1 specimen 9 cm. long.

ALBERT B. ULREY, Bloomington, Ind.

On the Species of Himantodes D. & B.—This genus of snakes is represented by numerous individuals in tropical America, and sufficient material is now at hand to render it possible to determine the number of species to which they belong. An examination shows that the typical species *H. cenchoa* L., does not occur in Central America and Mexico, the individuals which have been hitherto referred to it, representing another species, which I call *H. semifasciatus.* Of the seven species, five belong to this region, and two to continental South America.

I. A small additional superior preocular plate.

Scales in 17 rows; superior labials 4 and 5 in orbit; one scale in first temporal row; vertebral row enlarged; dorsal spots extending to gastrosteges throughout; *H. cenchoa*[3] L.

II. One large preocular plate only.

α. Scales in 15 rows.

One scale in first temporal row; superior labials 4, 5, and 6 bounding orbit; vertebral row enlarged; dorsal spots terminating in an angle near gastrosteges; no lateral spots; *H. lentiferus* Cope.

αα. Scales in 17 rows.

β. One scale in first temporal row.

[Two labials in orbit; vertebral scales enlarged; on posterior two-thirds the length the dorsal spots are small and lateral spots are present; exceptionally, *H. semifasciatus* Cope.]

Two labials in orbit; vertebral scales similar to the others, spots as in *H. semifasciatus*; *H. gemmistratus* Cope.

ββ. Two scales in first temporal row.

υ. Dorsal spots continued to gastrosteges throughout.

Vertebral row enlarged; superior labials 4 and 5 in orbit; *H. leucomelas* Cope.

Vertebral row like other scales; superior labials 4, 5, and 6 in orbit; *H. tenuissimus* Cope.

υυ. Dorsal spots reduced posteriorly; lateral spots.

Vertebral row enlarged; *H. semifasciatus* Cope.

[Vertebral row like others; exceptionally, *H. gemmistratus* Cope.]

III. A small inferior preocular plate.

β. Two scales in first temporal row.

Scales in 17 rows; vertebrals large, wider than long; labials 4 and 5 in orbit; dorsal spots continued to gastrosteges throughout; *H. anisolepis* Cope.

Himantodes lentiferus sp. nov. Besides the characters already mentioned, this species exhibits the following: Labials eight above, ten below. Seventh superior labial as high as long; temporals 1–2–3. Postgenials in contact anteriorly, separated by two scales posteriorly.

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[3] Specimens from Brazil and E. Ecuador from Prof. Orton.

Superior postocular three times as large as inferior. Vertebral scuta wider than long. While the dorsal spots are acute angled below generally, they are not so on the tail and anterior region; on the latter many of them are separated by a much smaller vertebral spot. Top of head brown, brown spotted; lips and throat unspotted; other inferior regions black speckled. Total length 622 mm.; tail 189 mm. Pebas, Ecuador, J. Hauxwell; E. Equador, J. Orton.

The characters of this species are well marked, as compared with those of the *H. cenchoa.* Of the latter I have four from Peru (Orton) and one from Ecuador (Hauxwell.)

Himantodes semifasciatus sp. nov. The width of the vertebral series of scales varies in the numerous specimens I have assigned to the *H. semifasciatus;* in some the width is nearly equal to the length, while in others it is considerably less. The apices of the vertebral scales are, however, always truncate, and never acuminate like the other scales, as is seen in the *H. gemmistratus.* There are usually two scales in the first temporal row in this species, while there is invariably only one in the *H. gemmistratus,* but in three of the nine Costa Rican specimens there is but one scale. The largest specimens belong to the *H. semifasciatus.* One of these (No. 101) measures; total length 1125 mm.; tail 380 mm.

Ten specimens from Costa Rica; Paso Azul, Santa Clara, Carrillo, Alajuela, Monte Aguacate, and San José; from the Museo Nacional, through Geo. K. Cherrie. Two specimens in Mus. Academy, Philada. from Nicaragua.

Himantodes anisolepis sp. nov. Besides the characters already mentioned, the following may be noted. The small inferior preocular is cut from the fourth superior labial; the labials number eight above and ten below. The lower post-ocular is one-third the size of the superior. Temporals 2–2–3. The postgenials are entirely separated by scales. Thirty-nine brown spots from the head to the vent, which extend nearly to the gastrosteges, with truncate or rounded inferior border, on a very pale ground. Belly unspotted. Total length 420 mm. of tail, 127 mm. Monte Aguacate, Costa Rica, G. Witting.

This slender species resembles in coloration the *H. tenuissimus* and *H. leucomelas.* It differs sufficiently in scale characters from both.—E. D. Cope.

Zoological News.—M. de Guerne recently reported to the *Société Acclimatation de France* the capture in the open sea of a female eel bearing mature eggs. (Rev. Sci. March, 1894.)

Prof. Carl Eigenmann is in receipt of a Ling (*Lota lota maculosa*) from the Columbia River which does not show any specific differences from those of Lake Michigan. This fish is found in all three of the large water basins of the Atlantic slope—the Saskatchewan, St. Lawrence and Mississippi, and its distribution is now extended to the Pacific Slope. (Science Vol. XXIII, 1894.)

Distomum leptodon, a new Trematode from the intestine of *Aplodinotus grunniens* (River Drum) has lately been described by W. G. MacCallum in a paper before the Natural Science Association of Toronto University.